VAA-Weekly-Progress

10/30-11/05

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Goals for this week

Training and Testing RTMPose on Subsets:

- Entire AP10k (without antelopes) - **Claire**
  - Train AP10k dataset without antelopes (Reach out to Medha or Shaan if needing help with creating the new dataset or adjusting the config file)
  - Test with the antelope subset (filtered_ap10k_test_antelopes/annotations/test_annotations.json)
  - Begin comparison of the 3 trained models in terms of metrics (AP and AR)
- Bovidae + Cervidae (without antelopes) - **Medha**
  - Make sure checkpoint is in correct location
  - Test with the antelope subset (filtered_ap10k_test_antelopes/annotations/test_annotations.json)
  - Attempt running trained model on our antelope data + AP10k antelope images to visualize
  - Begin comparison of the 3 trained models in terms of metrics (AP and AR)
  - Look into how fine-tuning models works if time permits
- Bovidae (without antelopes) - **Shaan**
  - Make sure checkpoint is in correct location
  - Test with the antelope subset (filtered_ap10k_test_antelopes/annotations/test_annotations.json)
  - Attempt running trained model on our antelope data + AP10k antelope images to visualize
  - Begin comparison of the 3 trained models in terms of metrics (AP and AR)
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Labeling

- Handpick images that are classified as more important (remove night-time images through checking saturation and pick images with fully visible antelope) - **Josh**
- Label Assigned Images on Tuesday - **Everyone**

Analyzing Similarity

- Explore ways to analyze similarity (ratios, segmentation, variance of centroid, apple depth pro AI…) - **Parth, Armaan, Aryan, Josh**
- Try and get proof of concept done for SAM -> Depth Pro pipeline to get a sideview dataset to study limb length ratios
- Fix code for similarity, ratios cosine similarity

*Note: will need to push cataloguing the data (how many medium/large images? What is classified medium/large..) till next week

Bovidae + Cervidae Testing Metrics

Training Data: Bovidae (argali sheep, bison, buffalo, cow, sheep) + Cervidae (moose, deer)
Testing Data: 100 randomly selected antelope images (set kept constant throughout testing models)

coco/AP:	0.757
coco/AP .5:	0.958
coco/AP .75:	0.836
coco/AP (M):	0.606
coco/AP (L):	0.766

coco/AR:	0.781
coco/AR .5:	0.966
coco/AR .75:	0.848
coco/AR (M):	0.620
coco/AR (L):	0.789

Notes on Metrics

Bovidae Testing Metrics

Training Data: Bovidae (argali sheep, bison, buffalo, cow, sheep)
Testing Data: 100 randomly selected antelope images (set kept constant throughout testing models)

coco/AP:	0.724
coco/AP .5:	0.935
coco/AP .75:	0.814
coco/AP (M):	0.492
coco/AP (L):	0.735

coco/AR:	0.748
coco/AR .5:	0.941
coco/AR .75:	0.833
coco/AR (M):	0.510
coco/AR (L):	0.760

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Full dataset testing metrics

Training Data: All AP10k images excluding antelopes
Testing Data: 100 randomly selected antelope images (set kept constant throughout testing models)

coco/AP:	0.805
coco/AP .5:	0.968
coco/AP .75:	0.865
coco/AP (M):	0.777
coco/AP (L):	0.806

coco/AR:	0.825
coco/AR .5:	0.971
coco/AR .75:	0.877
coco/AR (M):	0.800
coco/AR (L):	0.826

Comparison

Metric	Bovidae	Bovidae+Cervidae	AP10k without antelopes
coco/AP:	0.724	0.757	0.805
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Bovidae + Cervidae Inferencing

https://github.com/open-mmlab/mmpose/blob/main/docs/en/user_guides/inference.md - command is on github

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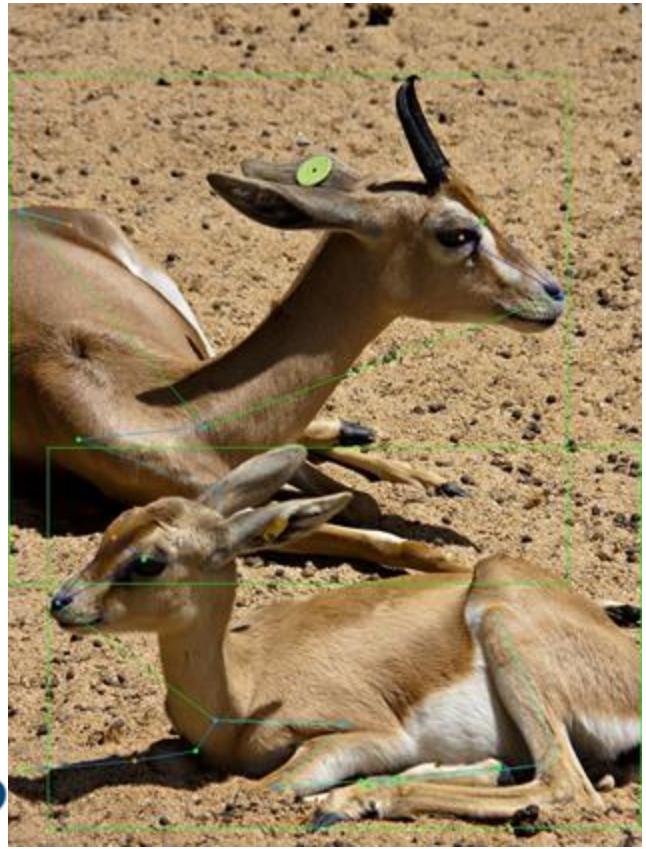
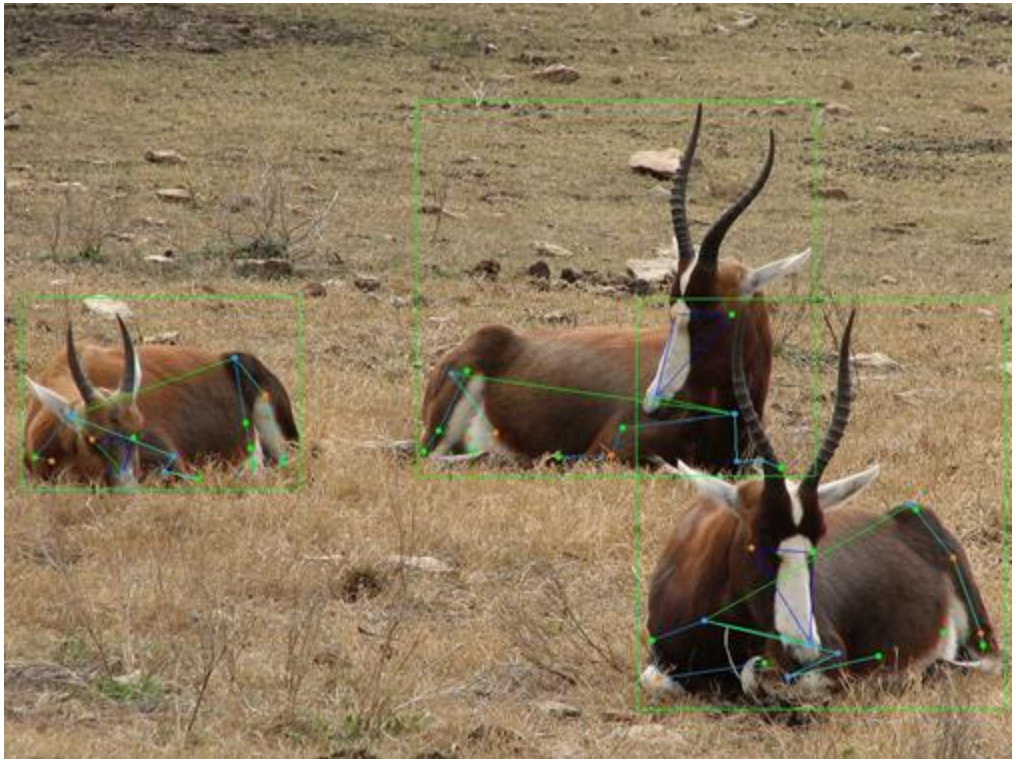
Bovidae + Cervidae Inferencing





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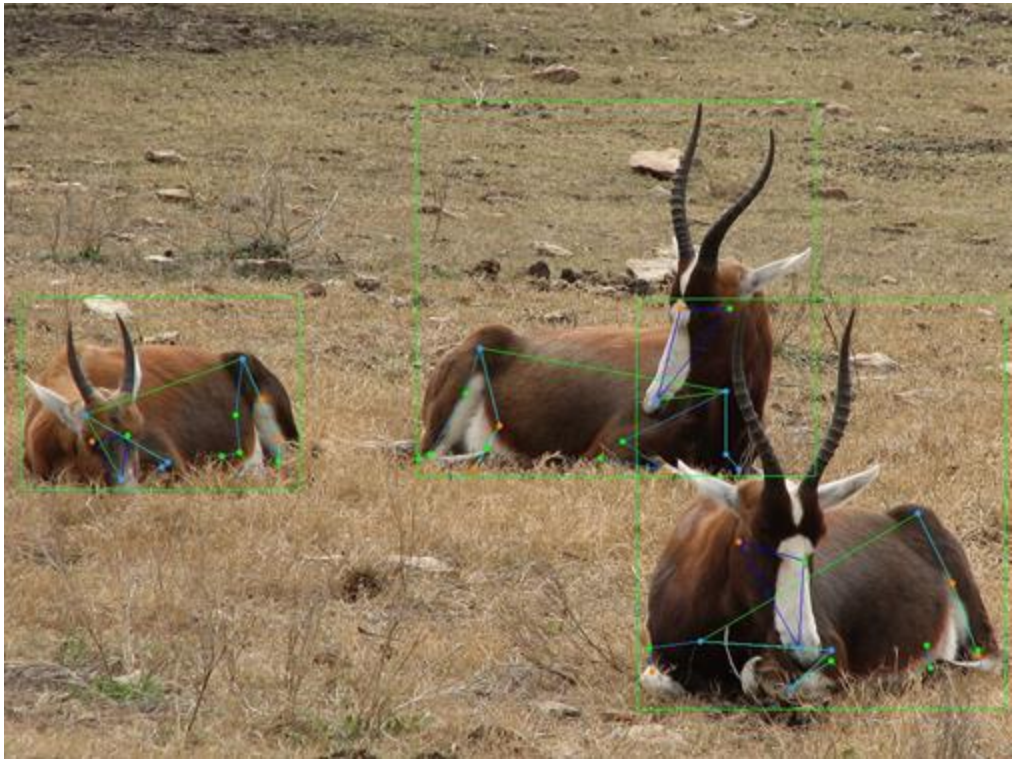
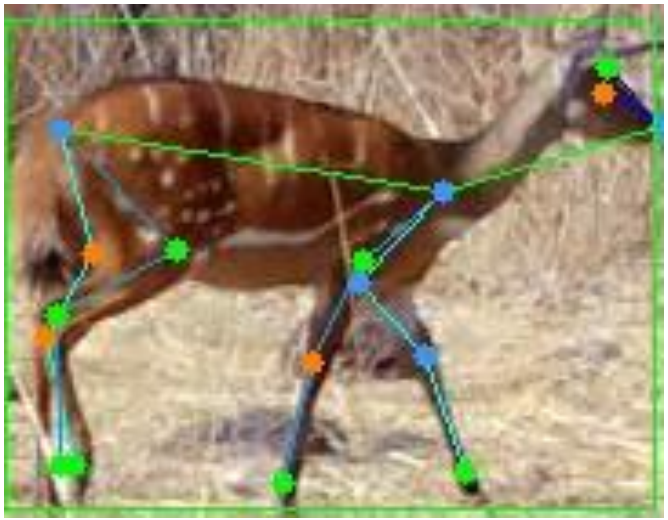
Bovidae Inferencing



Bovidae + Cervidae Inferencing



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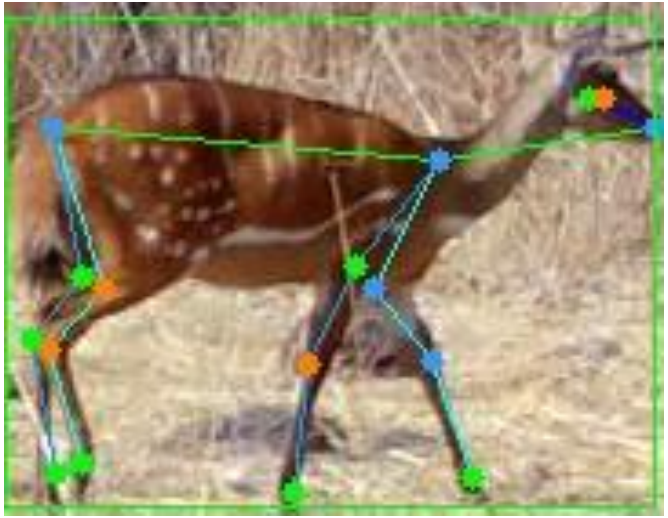
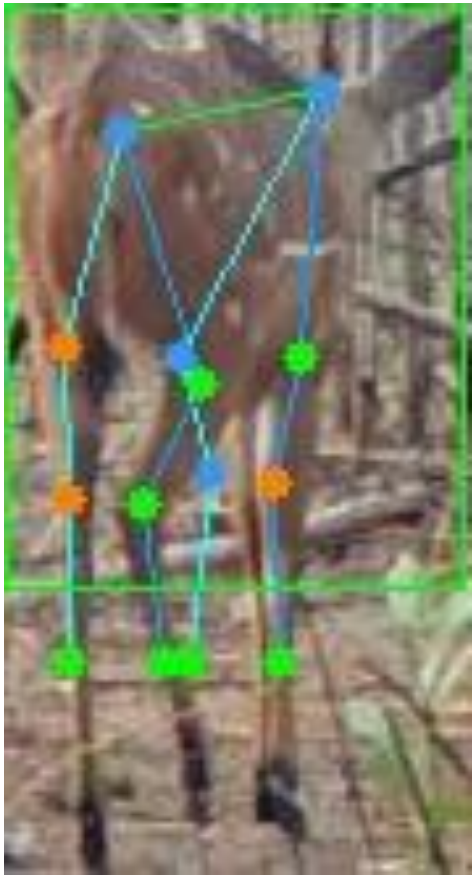
Bovidae Inferencing

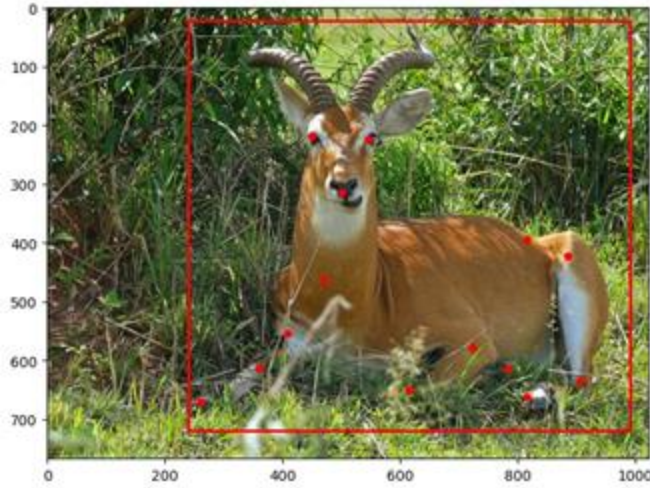




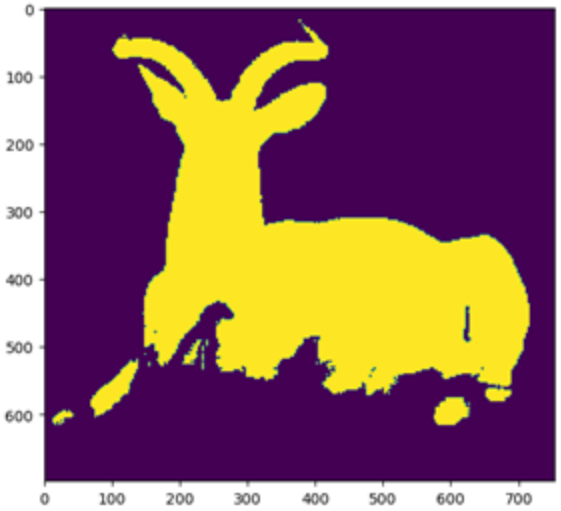
Similarity Analysis

Proof of concept for extracting side view images from AP10k dataset.

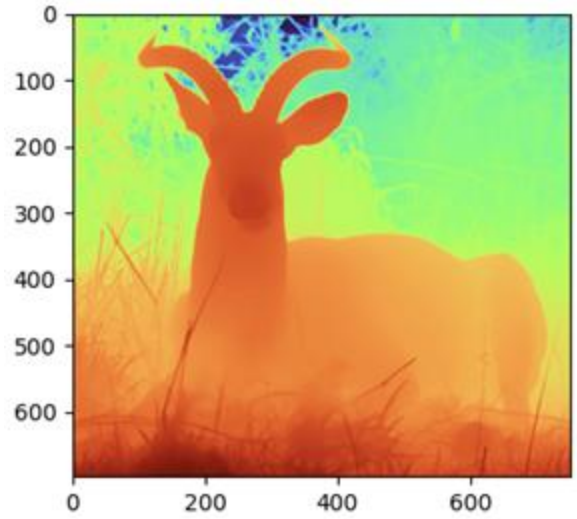
AP10k Image



SAM Inference on
Bbox using keypoints

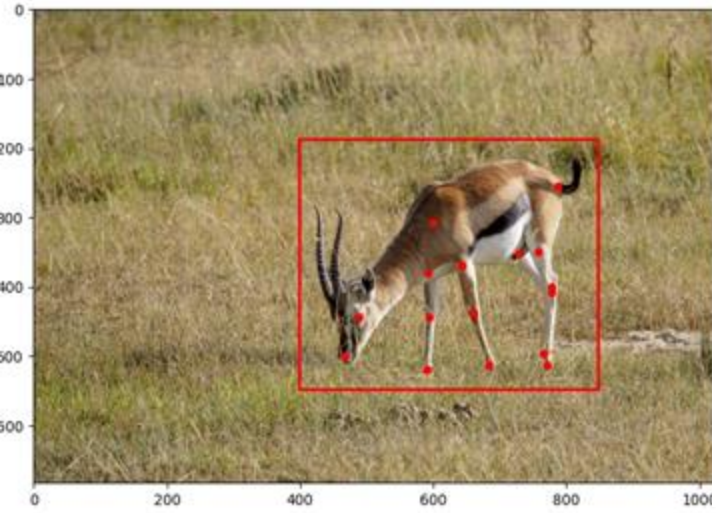


Apple Depth-Pro
Inference on Bbox

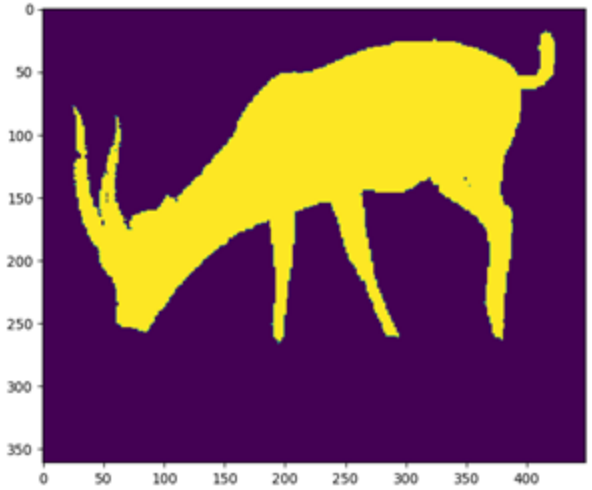


Similarity Analysis

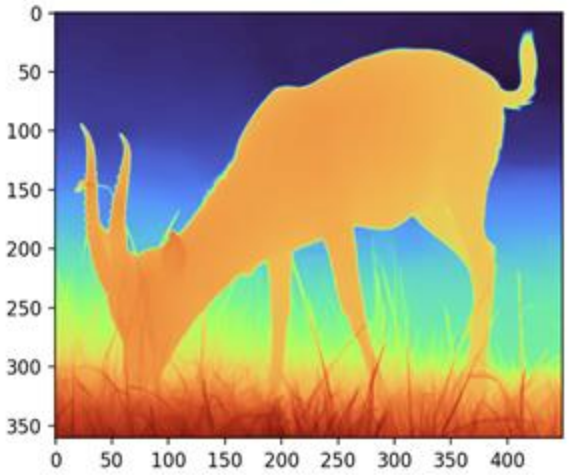
AP10k Image



SAM Inference on Bbox using keypoints



Apple Depth-Pro Inference on Bbox



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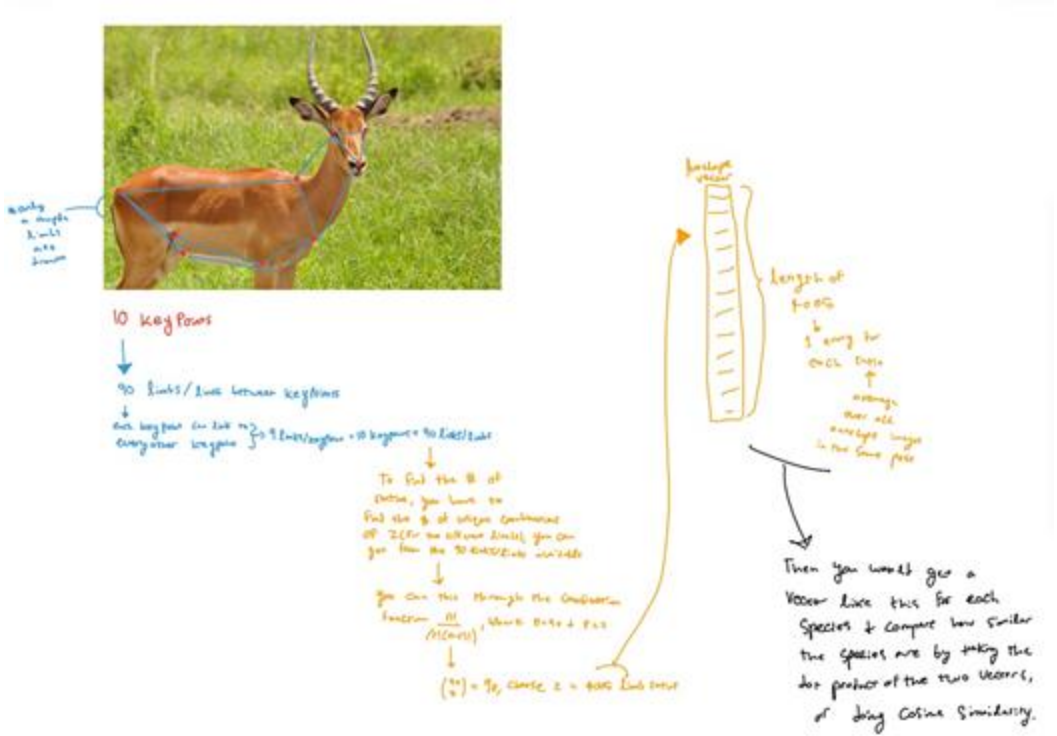
Similarity Analysis - “limb” ratio similarity



Next Steps

- Evaluate RTMPose trained on full AP-10K(without antelopes) on antelope testing set, and visualize performance on inference images
- Try using SAM on Depth-Pro output rather than original bounding box
- Write code to identify if animal is sideview or not using depths near keypoint locations
- Document the data (What is classified medium/large? How many medium/large images? etc…)
- Begin annotating antelope images
- Prepare draft for poster

Personal Progress

Medha

- Tested Bovidae+Cervidae on antelopes
- Ran inferencing on antelope images to get visual analysis on both AP10k images and our image set
- Did some documentation on the coco metrics used
- Annotated Images with new keypoint definition
- Wrote up goals for the week

Josh

- Manually filtered out all images with similar poses and night-time images, on the label studio annotation project.
- Reconfigured the label interface in the label studio, so that the displayed key points were up-to-date with our current keypoint definitions
- Developed a more refined plan for determining how to compare the visual similarity between animals using “limb”(distance between key point) ratios.

Shaan

- Tested Bovidae model on antelopes
- Inferenced model on sample images from Senegal dataset for qualitative analysis
- Setup SAM and Apple Depth-Pro models and tested out on sample images from AP10k dataset

Parth

- Annotated assigned images using keypoint definition
- Discussed species similarity approaches
  - Decided cosine similarity (with limb ratios) with group for our own definition of species similarity for the poster
- Found different ways to filter poses for AP-10k animals for species similarity analysis. Need to discuss which to use with group before proceeding with the cosine similarity for limb ratios.

Claire

- Trained RTMPose on AP10k dataset (excluding Antelopes)
- Tested trained model on antelopes
- Annotated assigned images using new keypoint definitions

Aryan

Annotated assigned images using keypoint definitions

Discussed species similarity approaches